Mission Unforgettable

Public rides NASA Shuttle Web to get virtual experience, ask questions of astronauts on orbit

By Bridget Mintz Testa

U ntil recently, the primary source of space news for most people was the media. But now, with a computer, access to the Internet, and an interface (browser) for the World Wide Web, anybody can go online with the space shuttle's crew… in real time.

And that's exactly what's happened since the NASA Shuttle Web page (http://shuttle .nasa.gov/) was built earlier this year. Millions of "hits"—connections—have been measured, translating into hundreds of thousands of curious individuals from up to 69 different countries. People can watch about 60 telemetry parameters change before their eyes during launch, orbit and landing. They can download video clips and still images and listen to snippets of air-to-ground conversations.

A very lucky few—who've asked interesting questions—get an even bigger thrill when the crew answers them. "The crew calls out the questioner by name," says Kelly Humphries, the JSC Public Affairs Office's team lead for information services and the NASA Shuttle Web. "How much more a part of the mission can you be than to hear your name on the air-to-ground?" The space shuttle page's STS-71 (http://shuttle.nasa.gov/sts-71/) debut in June was wildly successful. For this first Phase 1 shuttle-Mir mission, the page netted some 3 million hits. But this wasn't the first amazing success NASA had with Web pages. The shuttle page had a predecessor which had shown just what the Web could do to help demonstrate NASA's position as a cutting-edge science and engineering agency.

That was Astro-2's Web page for STS-67 (http://liftoff.msfc.nasa.gov/archive/astro2/welcome.html). The 16-day March mission flew an ultraviolet observatory in Endeavour's payload bay… and the Astro-2 Web page allowed some 200,000 people from 59 different countries to experience the mission practically first-

hand via some 2.6 million hits. Becky Bray, a payload activity planner in the Marshall Space Flight Center's Mission Operations Lab, was part of the team that built the Astro-2 page. Bray had been introduced to the Internet by MSFC systems engineer Patrick Meyer. She started generating information about the Net for the Astro-2 team.

"There was a synergistic effect between (the operations team) and the scientists which led

full of firsts: pictures from the mission, opportunities to ask questions of the crew and mission scientists, video clips, a real-time shuttle tracking chart, a calculator for orbital velocity and period, virtual reality models built for Astro-2 and a real-time Astro-2 operations page featuring stellar data like right ascension, declination and object type. People wrote to offer money to NASA ("I gave them my bank account number," Bray jokes). They wanted to buy astro-

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to the question: wouldn't this be neat for the public?" she says.

So a team comprised of Bray, Meyer, John Piner and lab director Harvey Golden sat down at a table Dec. 1 to brainstorm the page's design.

"We asked ourselves what we'd enjoy finding out about a mission if we were part of the general public," Bray says. "We came up with mission planning, operations, the crew… we wanted to show the human side of NASA along with the engineering."

The brainstorming effort resulted in a page

naut action figures. And they complained—bitterly—about the media's lack of coverage of the mission. "Headquarters got very interested," Bray says.

Brian Welch, chief of News and Information at NASA Headquarters, says, "They put together a page that got lots of play on the Web." Netscape, a widely used Web browser, has a "cool site of the day" feature—and on the first or second day of the Astro 2 mission, its home page was selected. "Tens of thousands of people looked at it," Welch says. "It became very popular."

At the time, Headquarters was creating some Web pages, and a shuttle home page was under consideration. This was part of an effort begun in 1993 in which an Internet steering group was formed to make decisions about how Internet technology should be used to further NASA's mission. After Astro-2, the shuttle page was given an OK.

Welch said JSC was chosen to lead the NASA-wide effort for one simple reason. "After we start flying," he said, "most of the data comes from Bldg. 30." The NASA Shuttle Web effort began in April, with the STS-71 deadline just two months away. Humphries assembled a team at JSC including Dan McCoy (of JSC Web page fame), Eric Nielsen (McCoy's successor as shuttle page Webmaster), Stan Johnson (ISD network engineer), Chris Ortiz (ISD programmer), Dave Krenek (ISD Graphics and Publications) and ISD video engineers Kevin Marsh and Dan Willett. Humphries stresses that the effort was center wide and NASA-wide. For example, the first technical problem to be resolved was finding a host computer for the page.

"The Engineering Directorate gave us a Convex," he says. "And then Convex donated additional equipment to make it work." Nielsen agrees. "What's real interesting about this project is that everything was done on a hand-shake basis between the different directorates (MOD, ISD, Engineering, PAO, and others)," he says. "There are lots of people involved and they don't need any real direction."

At other centers, the same "can-do" cooperative NASA spirit prevailed. At Kennedy Space Center, Jim Dumoulin handled the preflight section of the Web page, which is now called

"Countdown." Lewis had a page for its STS-73 payload which was linked from the shuttle page.

"Whenever we have a payload or mission involving another center," Humphries says, "they provide the information. Goddard for Wake Shield and Spartan, Ames for animal enclosures, JPL for planetary probes. Any center with information on the flight has a mechanism to get information on the Web pages."

The Shuttle Web design process was very similar to the Astro-2 process. Nielsen says, "Everyone got in a room with a whiteboard and sketched out the page organization." Four primary sections were decided upon: preflight, launch, orbit, and landing. "The goal," Nielsen says, "was to provide as much up-to-date shuttle information as possible—background (history), daily status reports, movies and real-time data updated every minute."

The initial design for the page was heavily graphical. Krenek, who supervised the graphics design for the page, says, "We had a new kind of art—clickable art—where you can go into different areas of an illustration, click, and go somewhere. Our requirements were for about 10 clickable areas with links. Another requirement was that the clickable areas look three-dimensional. Each page has a mission patch and a NASA logo, which are referred to as the "ruby slippers" links. Clicking the patch always returns you to the shuttle home page; clicking on the "meatball" takes you to NASA Headquarters home page (http://www.nasa .gov/). The team felt that having a link to Headquarters rather than any individual center's page was another way of emphasizing that each shuttle mission is a NASA-wide effort.
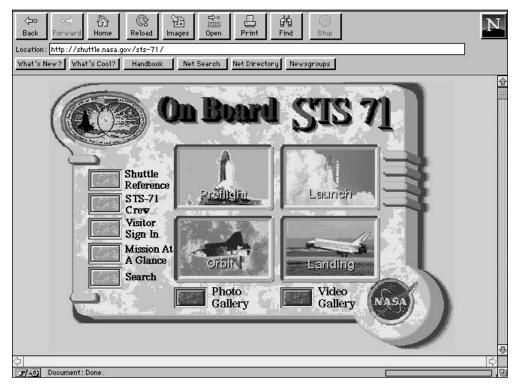
The first shuttle pages sported different three-dimensional graphics on each of 12 pages, but the effort involved in updating the graphics turned out to be immense. So recent shuttle pages feature a new look; the photo-panels for the four sections are still present, but many of the time-consuming graphics have been replaced with reuseable buttons.

"This version is scrollable art," Krenek says. Despite the high-technology aspect of the Web page, Krenek's classic 386 PC serves as the benchmark for the page's graphic design. "The basic Internet user has basic equipment," he says.

One of the most exciting aspects of the page is getting real-time mission data. From Mission Control, data exits Bldg. 30 via a gateway to the Convex C-220 mainframe server in Bldg. 46. From that raw data stream, the Information Sharing Protocol, developed at JSC, identifies and delivers the list of parameters for the Web page. Chris Ortiz handled the programming required to deliver the 60-some telemetry parameters to the shuttle page and automatically rewrite it.

The intensity of the "you-are-there" sensation that the public gets from the real-time data, the interactions with the crew, the pictures, movies, status reports and previously unavailable reference documents can be measured by the millions of hits—translating roughly into hundreds of thousands of people—who have "touched" the shuttle mission pages since STS-71.

Geoff Vincent, Headquarters deputy associate administrator of Public Affairs, says, "The mission page gives NASA a continuing high profile on the World Wide Web that is entirely consistent with what NASA ought to be doing on the Net. That is, as a cutting-edge science and engineering agency, people expect NASA to have a strong, exciting presence on the Web. NASA does so much that's inherently interesting—our challenge is to convey that through the home page." ❏

Top: The "new look" of the NASA Shuttle Web, which debuted on STS-73, features a dark background; a header graphic that is slightly different for each of the four major areas Countdown, Launch, Orbit, and Landing; and clickable buttons that are stored in the visitor's computer and reused, eliminating the need for that user to download the buttons each time a new page is accessed. Above: The original NASA Shuttle Web, which debuted on STS-71, used a process called "image mapping" to make a single, large graphic clickable. By clicking on a different area of the graphic, visitors were transported to different sections of the Web site.